



# East Waterway Anthropogenic Background Considerations and Available Datasets

East Waterway Group

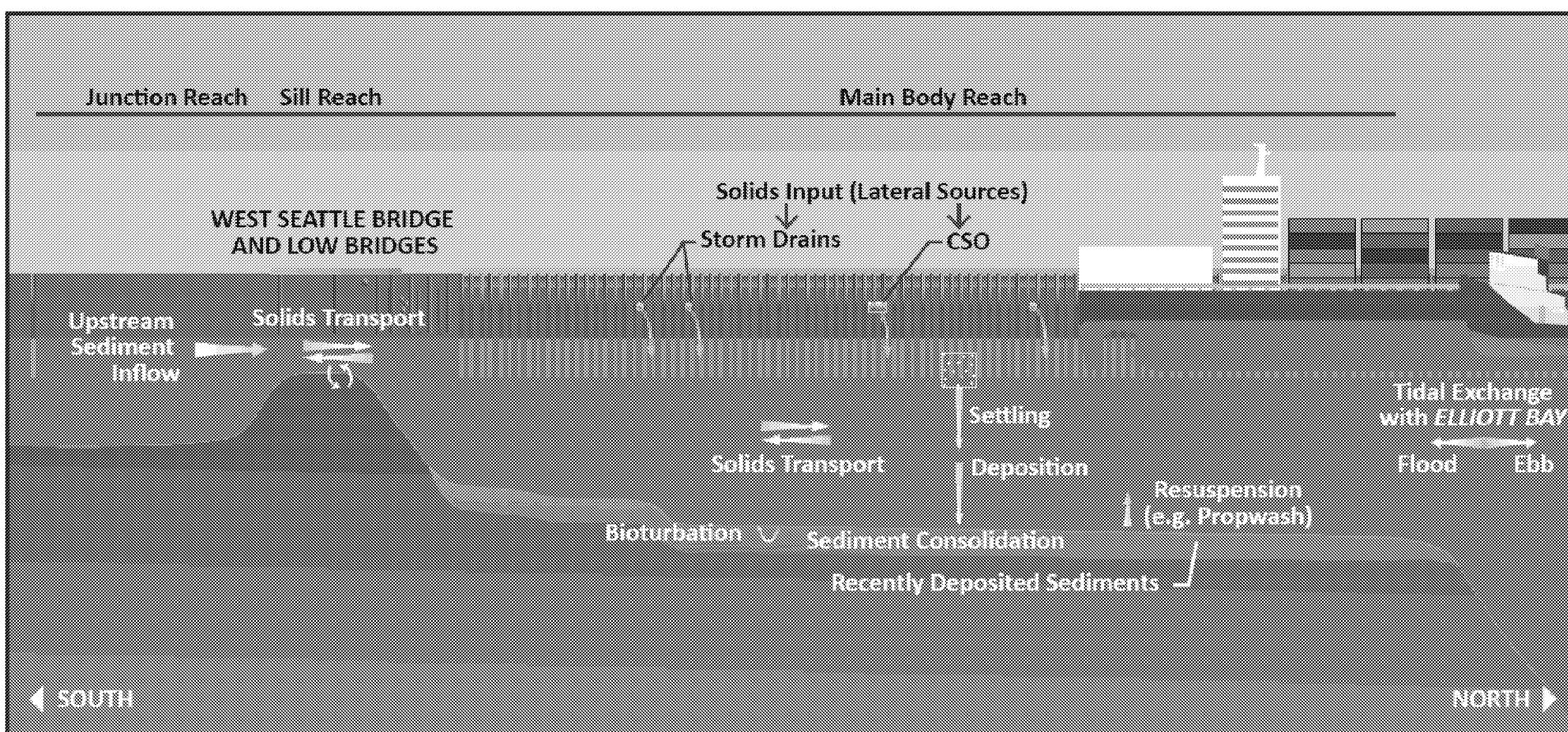
August 12, 2020

# Meeting Topics

- Review conceptual site model
- Proposed anthropogenic background approach
- Review available datasets
  - Data used in EW FS
  - Recent data
- Next steps



# Conceptual Site Model

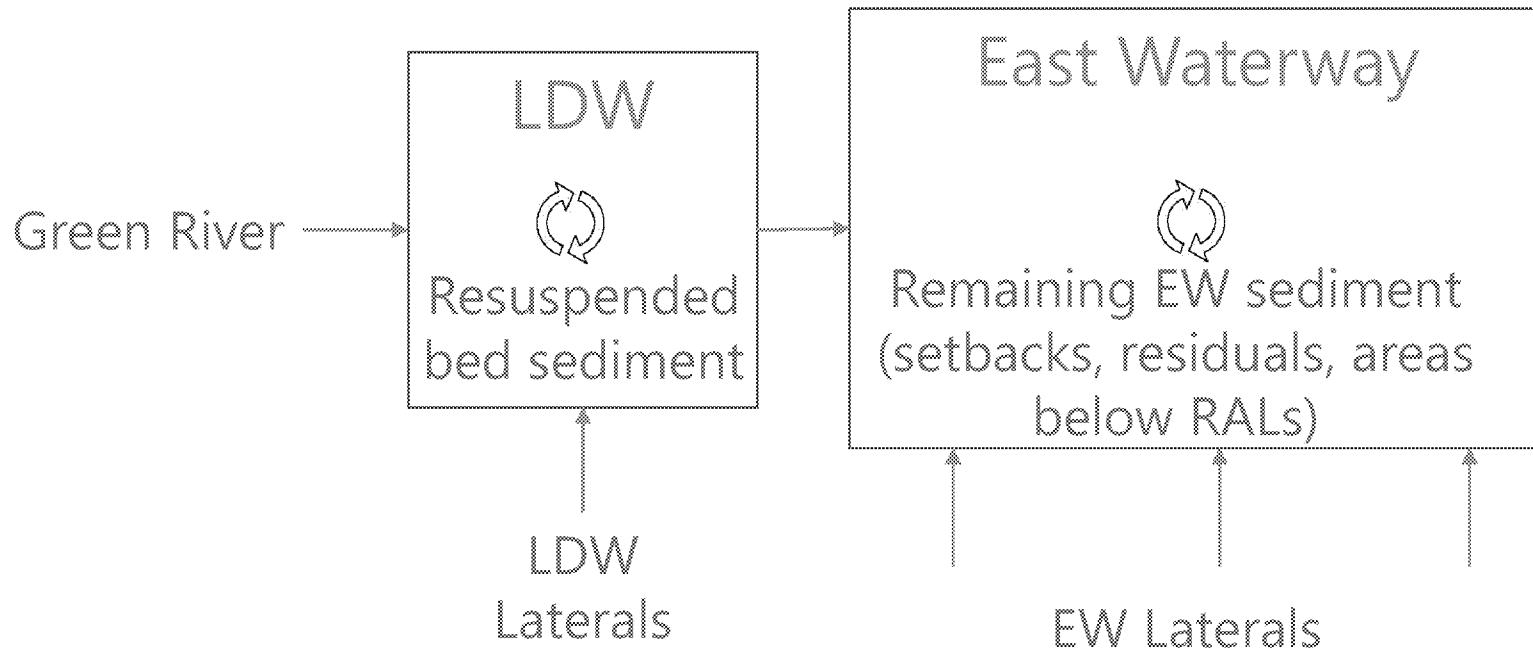


- Solids Inputs
- Mixing
- Structures

Anthropogenic Background Considerations and Available Datasets  
East Waterway Sediment Cleanup

Presented by East Waterway Group

# Components Influencing Long Term EW Sediment Concentrations



# Proposed Anthropogenic Background Approach

1. State the problem
2. Identify the goals of the evaluation
3. Identify inputs to EW
  - a) Solids (inputs and proportions)
  - b) Chemistry (available data for each input)
4. Specify acceptance criteria
  - a) Adequacy of available data
5. Develop the data analysis approach
6. Perform analysis

# Existing Data Summarized in EW FS

**Anthropogenic Background Considerations and Available Datasets**  
East Waterway Sediment Cleanup

Presented by East Waterway Group

# Inventory of Incoming Solids

- Solids Inputs
  - Green River – 99%
  - EW laterals (CSOs and stormdrains) – 0.3%
    - Total mass calculated using particle tracking modeling
  - LDW bed – 0.2%
  - LDW laterals – 0.6%
- Solids inputs summarized FS Section 5.1.1

# EW FS Chemistry Data Sources

- FS developed estimates for PCBs, Dioxin/Furan, Arsenic, and cPAHs
  - Green River – same lines of evidence as LDW FS
  - EW laterals
    - CSOs – based on City and County datasets collected through 2012; existing and future
    - Stormwater – based on City and Port datasets collected through 2012; existing and future
  - LDW bed – from LDW FS sediment transport model baseline SWAC
  - LDW laterals – from LDW FS data collected through 2009; existing and future

# Chemistry Estimates for Each Input

- Solids chemistry summarized in FS Appendix J Tables 9a (current conditions) and 9b (future conditions)
- FS developed weighted averages for each input (FS Table 5-4) using average net sedimentation rate and assumed density of deposited sediment
- Calculated incoming solids concentrations in FS Table 5-5

# Green River Datasets Used in EW FS

- EW FS Appendix B, Part 3B as reported in LDW FS baseline database
  - King County upstream whole water samples from 2001 to 2008 (AECOM 2012)
  - Ecology upstream centrifuged suspended solids samples in 2008 and 2009 (Ecology 2009)
  - Ecology upstream surface sediment samples in 2008 (RM 4.9 to 6.5) (AECOM 2012)
  - USACE dredge material characterization core data (RM 4.3 to 4.75 from 1990 to 2009)

	Best Estimate	Low	High
Total PCBs (ug/kg dw)	42	5	80
Arsenic (mg/kg dw)	9	7	10
Dioxin/Furan (ng TEQ/kg dw)	6	2	8

# Recent Data

**Anthropogenic Background Considerations and Available Datasets**  
East Waterway Sediment Cleanup

Presented by East Waterway Group



# Recent Green River Datasets

- Multiple recent studies summarized in the *LDW Pre-Design Studies Data Evaluation Report* (Windward 2020)
  - Filtered solids collected at RM 10.4 (2013 to 2015) (King County 2016)
  - Solids collected in sediment traps at RM 10.4 (2013 to 2015) (King County 2016)
  - Centrifuged solids collected at RM 10.4 by U.S. Geological Survey (USGS) (2013, 2015, and 2017) (Conn and Black 2014; Conn et. al. 2015, 2018)
  - Fine-grained (<62.5 micrometer) bedded sediments collected upstream at RM 10.4 by USGS (2013 to 2015) (Conn and Black 2014; Conn et. al. 2015, 2018)
  - Sediment core data collected at the Turning Basin (RM 4.3 to RM 4.75) by USACE (2011 and 2017) (USACE 2011, 2018)
- Each study was designed with DQOs, Sampling and Analysis Plan with QA/QC, data validation, and publication

# Recent Green River Datasets (Windward 2020)

**Table 8-4. BCM upstream summary table – binned**

COC	Bedded Sediment Data		Suspended Sediments Data		Turning Basin Cores
	Ecology 2008; USGS 2014/2015 <sup>a</sup>		King County Filtered Solids: 2013–2015; USGS Centrifuged Solids: 2013–2017		Ecology Centrifuged Solids: 2008/2009; King County Filtered Solids: 2013–2015; King County Sediment Traps: 2013–2015; USGS Centrifuged Solids: 2013–2017
	All Conditions	Baseflow	Storms <sup>b</sup>	Combined Baseflow and All Storm Events <sup>c</sup>	RM 4.3–RM 4.75
PCBs <sup>d,e</sup> (µg/kg)	n = 37 3 (median) 6 (mean) 8 (95UCL) 12 (90 <sup>th</sup> pctile)	n = 13 7 (median) 8 (mean) 11 (95UCL) 14 (90 <sup>th</sup> pctile)	n = 36 12 (median) 20 (mean) 29 (95UCL) 55 (90 <sup>th</sup> pctile)	n = 65 8 (median) 16 (mean) 20 (95UCL) 42 (90 <sup>th</sup> pctile)	n = 17 16 (median) 26 (mean) 41 (95UCL) 55 (90 <sup>th</sup> pctile)
Arsenic <sup>d</sup> (mg/kg)	n = 38 9 (median) 9 (mean) 10 (95UCL) 12 (90 <sup>th</sup> pctile)	n = 11 26 (median) 25 (mean) 32 (95UCL) 37 (90 <sup>th</sup> pctile)	n = 34 13 (median) 15 (mean) 17 (95UCL) 24 (90 <sup>th</sup> pctile)	n = 59 14 (median) 16 (mean) 18 (95UCL) 26 (90 <sup>th</sup> pctile)	n = 18 16 (median) 16 (mean) 11 (95UCL) 13 (90 <sup>th</sup> pctile)
Dioxin/ furan <sup>d,f</sup> TEQ (ng/kg)	n = 38 2 (median) 2 (mean) 2 (95UCL) 3 (90 <sup>th</sup> pctile)	n = 14 3 (median) 4 (mean) 5 (95UCL) 6 (90 <sup>th</sup> pctile)	n = 34 6 (median) 7 (mean) 10 (95UCL) 18 (90 <sup>th</sup> pctile)	n = 59 4 (median) 6 (mean) 7 (95UCL) 13 (90 <sup>th</sup> pctile)	n = 12 2 (median) 2 (mean) 3 (95UCL) 3 (90 <sup>th</sup> pctile)

# Updated LDW Inputs to EW

- LDW lateral inputs
  - Updated in June 2020 in final *LDW Pre-Design Studies Data Evaluation Report* (Windward 2020)
    - 379 samples for PCBs
    - 351 samples for arsenic
    - 57 samples for dioxins/furans
- LDW bed sediment
  - Updated LDW baseline surface sediment data under EPA oversight based on data collected in 2018 (Windward 2020)

# Additional EW Lateral Data Since 2012

- King County
  - Lander CSO
  - Hanford #2 CSO
- City of Seattle
  - Hinds CSO
  - Lander Street storm drain
  - Nearshore storm drains
- Port of Seattle
  - Nearshore storm drains

# Next Steps

**Anthropogenic Background Considerations and Available Datasets**  
East Waterway Sediment Cleanup

Presented by East Waterway Group

# Next Steps

- Follow up meetings
  - Logistics
  - Timing
  - State and tribal involvement
  - Materials

# Questions/Discussion

